CLEAN COPY OF AMENDED SPECIFICATION

BACKGROUND OF THE INVENTION

(a) Field of the Invention

The present invention relates to a front sight night vision device, and more particularly, to one that is adapted to a rifle or a bow and that emits light to mark the location of the front sight during night hours or where visual contact is poor.

(b) Description of the Prior Art:

Whereas a front sight is required to aim at the target in shooting a bow or a rifle, the front sight may be easily seen during the daytime or where well-lighted. However, during night hours or where only poor visual contact is possible, the front sight may not be easily seen, thus affecting the percentage of proper targeting. Therefore, it is necessary to design a night vision device to mark the location of the front sight.

SUMMARY OF THE INVENTION

The primary purpose of the present invention is to provide a night vision device to mark the location of the front sight during night hours. To achieve this purpose, the present invention is essentially comprised of a casing, a power source, and a light emission device adapted to be mounted to the front sight; wherein, the casing contains a tube and a switch with the switch controlling the

power source, the power being conducted through the light emission device so as to mark the location of the front sight during night hours or where visual contact is poor.

Another purpose of the present invention is to provide a night vision device to mark the location of the front sight during night hours; wherein, a light conductor is further provided at the front end of the light emission device to direct the light to the front sight.

Another purpose of the present invention is to provide a night vision device to mark the location of the front sight; wherein, the casing contains a tube and a switch, and the switch includes a first switch and a second switch. The second switch includes an elastic member and a sleeve. Both ends of the tube are externally threaded, and both of the first and the second switches, respectively, in relation to the tube, are also threaded so to engage both ends of the tube. A hole is drilled through the mid-section of the tube. One end of the elastic member is fixed in the second switch and the other end of the elastic member is fixed to the sleeve. The power source is provided with a first electrode and a second electrode. The light emission device is provided with a first electrode pin and a second electrode pin so that the light emission device is inserted through the hole in the middle of the tube of the casing with the first electrode pin and the second electrode pin of the light emission device contained within the tube. The power source is received in the tube of the

casing and is threaded to one end of the tube with the first switch. The second electrode of the power source contacts the first electrode pin of the light emission device, and the second electrode of the power source contacts the first switch. The second switch is threaded to another end of the tube. By tightening the second switch, the elastic member and the sleeve are held against the second electrode pin of the light emission device. The first switch is released from contacting the first electrode of the power source by loosening the first switch; or by loosening the second switch. Both the elastic member and the sleeve are released from contacting the second electrode pin of the light emission device by loosening the second switch.

Another purpose of the present invention is to provide a night vision device to mark the location of the front sight; wherein a retainer is provided in the first switch, an insulation elastic washer is inserted at the bottom of the retainer so that once the first switch is tightened up, the elastic washer is slightly compressed for the retainer to hold against the power source.

Another purpose of the present invention is to provide a night vision device to mark the location of the front sight; wherein the light conductor is an optical fiber.

Another purpose of the present invention is to provide a night vision device to mark the location of the front sight; wherein, the light conductor is an optical fiber wrapped in a protection tube.

Another purpose of the present invention is to provide a night vision device to mark the location of the front sight; wherein, the protection tube wrapping up the light conductor is comprised of a flexible section connected with a rigid section.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a cross-sectional view of an assembly of a first preferred embodiment of the present invention.

Fig. 2 is a view showing the operation of a first switch of the first preferred embodiment of the present invention.

Fig. 3 is a view showing the operation of a second switch of the first preferred embodiment of the present invention.

Fig. 4 is a view showing that the first preferred embodiment of the present invention is adapted to an automatic rifle.

Fig. 5 is a cross-sectional view of an assembly of a second preferred embodiment of the present invention.

Fig. 6 is a cross-sectional view of an assembly of a third preferred embodiment of the present invention.

Fig. 7 is a view showing that the third preferred embodiment of the present invention is adapted to an automatic rifle.

Fig. 8 is a view showing that the third preferred embodiment of the present invention is adapted to a modern bow.

Fig. 9 is an enlarged view showing that the third preferred embodiment of the present invention is adapted to the modern bow.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

Referring to Fig. 1, a first preferred embodiment of the present invention is comprised of a casing (1), a power source (2), and a light emission device (3) adapted to a front sight housing (51) (as illustrated in Fig. 4). The light emission device (3) emits the light to mark the location of a front sight in the front sight housing (51).

The casing (1) includes a hollow tube (11) and a switch set. The switch set includes a first switch (12) and a second switch (13). The second switch (13) contains an elastic member (14) and a sleeve (15). The tube (11) has both its ends respectively provided with external threads (111) and (112). Threads (121) and (131) are respectively provided on the first switch (12) and the second switch (13) for both the first switch (12) and the second switch (13) to respectively engage both ends of the tube (11). A washer (122) is assembled to the first switch (12) to provide waterproofing, once the present invention is assembled. A hole (113) is drilled through the mid-section of the tube (11). One end of the elastic member

(14) is fixed to the second switch in the tube (11), and the other end of the elastic member (14) is fixed to the sleeve (15).

The power source (2) contains a first electrode (21) and a second electrode (22).

The light emission device (3) includes a first electrode pin (31) and a second electrode pin (32). An insulation block (33) is inserted into the gap between the first electrode pin (31) and the second electrode pin (32). Another washer (34) is adapted to the insulation block (33) for waterproofing purposes, once the present invention is assembled.

Upon assembly, the light emission device (3) is inserted through the hole (113) in the mid-section of the tube (11) of the casing (1) to be contained together with the first electrode pin (31) and the second electrode pin (32) within the tube (11). The power source (2) is contained inside the tube (11) of the casing (1) with the thread (121) of the first switch (12) engaging the thread (111) at one end of the tube (111) so that the second electrode (22) of the power source (2) contacts the first electrode pin (31) of the light emission device (3), and the first electrode (21) of the power source (2) contacts the first switch (12). The second switch (13) engages the thread (112) on the other end of the tube (11) with the thread (131). The sleeve (15), at one end of the elastic member (14), is held against the second electrode pin (32) of the light emission device (3) by tightening the second switch (13). The casing (1) is conducts power from the power source (2) and the light

emission device (3) for the light emission device (3) to emit light due to the fact that the tube (11), the first switch (12), the second switch (13) of the casing (1), and the elastic member (14) and the sleeve (15) are all conductors.

As illustrated in Fig. 2, the light emission device (3) is prevented from emitting light by loosening the first switch (12) for the first switch (12) to no longer contact the first electrode (21) of the power source (2), thus forming an off circuit between the power source (2) and the light emission device (3).

Now referring to Fig. 3, the light emission device (3) is prevented from emitting light by loosening the second switch (13) for both of the elastic member (14) and the sleeve (15) to no longer contact the second electrode pin (32) of the light emission device (3) to form an off circuit between the power source (2) and the light emission device (3).

Fig. 4 is a schematic view showing that the first preferred embodiment of the present invention as applied to an automatic rifle (5). Wherein, the front sight housing (51) of the automatic rifle (5) is comparatively larger in size, a drill-hole is formed in the front sight housing (51) to directly fix the tube (11) of the casing (1) to the front sight housing (51) to expose both of the first switch (12) and the second switch (13) out of the front sight housing (51) in order to facilitate the operation of the first preferred embodiment of the present invention. Furthermore, a hole (52) having a smaller diameter is drilled through the front sight housing (51) to be directly connected through the location of a front sight (53) while the

light emission device (3) is located in the front sight housing (51) below the hole (52) for the light emitted from the light emission device (3) to be transmitted through the hole (52) in the front sight housing (51), where the front sight (53) is located. Thus, this allows a user of the automatic rifle (5) to identify the location of the front sight (53) when the preferred embodiment is properly employed.

A second preferred embodiment of the present invention is illustrated in Fig. 5 and comprises a casing (1A), a power source (2A), and a light emission device (3A). The casing (1A) includes a hollow tube (11A), a first switch (12A), a second switch (13A), and an elastic member (14A). Both ends of the tube (11A) are respectively provided with external threads (111A) and (112A). Threads (121A) and (131A) are respectively provided on the first switch (12A) and the second switch (13A) to respectively engage both ends of the tube (11A). A washer (122A) is assembled to the first switch (12A) for waterproofing purposes once the second preferred embodiment of the present invention is assembled. A hole (113A) is drilled in the middle of the tube (11A) and communicates with the interior of the tube (11A). One end of the elastic member (14A) is fixed in the second switch (13A) while the other end of the elastic member (14A) is fixed to the sleeve (15A). The power source (2A) includes a first electrode (21A) and a second electrode (22A). The light emission device (3A) contains a first electrode pin (31A) and a second electrode pin (32A). An insulation block (33A) is provided between the first electrode pin (32A) and the second electrode pin (33A)

and another washer (34A) is adapted to the light emission device (3A) for waterproofing purposes once the second preferred embodiment of the present invention is assembled. The second preferred embodiment differs from the first preferred embodiment of the present invention in that a retainer (123A) is provided in the first switch (12A) of the second preferred embodiment and also an insulation elastic washer (124A); i.e., an O-ring, as illustrated, is inserted at the top of the retainer (123A) so that upon tightening the first switch (12A), the elastic washer (124A) is slightly compressed for the retainer (123A) to be held against the first electrode (21A) of the power source (2A), thus conducting both of the power source (2A) and the light emission device (3A) for the light emission device (3A) to emit light. Further, the light emission device (3A) is prevented from emitting the light upon loosening up of the first switch (12A).

As illustrated in Fig. 6, a third preferred embodiment of the present invention includes a casing (1B), a power source (2B), a light emission device (3B) and a light conductor (4).

The casing (1B includes a tube (11B), a first switch (12B), and a second switch (13B). Both ends of the tube (11B) are respectively provided with external threads (111B) and (112B) and matching threads (121B) and (131B) respectively engage both ends of the tube (11B). A washer (122B) is assembled to the first switch (12B) for waterproofing purposes once the third preferred embodiment of the present invention is assembled. A retainer (123B) is provided in the first

switch (12B) and also an insulation elastic washer (124B); i.e., an O-ring, as illustrated, is inserted at the top of the retainer (123B). When tightening the first switch (12B), the elastic washer (124B) is slightly compressed for the retainer (123B) to be held against a first electrode (21B) of the power source (2B), thus to conduct both the power source (2B) and the light emission device (3B) for the light emission device (3A) to emit light. Further, the light emission device (3B) is prevented from emitting light upon loosening of the first switch (12B). The second switch (13B) in the third preferred embodiment is not operated in normal use as it is only loosened when replacement of the light emission device (3B) is required.

The power source (2B) includes a first electrode (21B) and a second electrode (22B).

The light emission device (3B) contains a first electrode pin (31B) and a second electrode pin (32B); an insulation block (33B) is provided between the first electrode pin (32B) and the second electrode pin (32B), both of the first electrode pin (32B) and the first electrode pin (31B) ~~is~~ are inserted into the insulation block (33B) while the second electrode pin (32B) rests flush against the outer side of the insulation block (33B).

The light conductor (4) includes an optical fiber (41), a flexible protection tube (42), and a rigid protection tube (43). One end of the optical fiber (41) is inserted in and fixed to the second switch (13B), in front of the light emission

device (3B). The optical fiber (41) is wrapped up with a protection tube comprised of the flexible protection tube (42) and the rigid protection tube (43). One end of the flexible protection tube (42) is fixed to the second switch (13B) to conduct the light emitted from the light emission device (3B) into the optical fiber (42). Another end of the flexible protection tube (42) is connected to one end of the rigid protection tube (3B) while the other end of the rigid protection tube (43) is provided on the front sight (53A) (as illustrated in Fig. 7).

Upon assembly, the power source (2B) is provided in the mid-sections of the tube (11B) of the casing (1B) and the light emission device (3B) is inserted into the tube (11B) with the insulation block (33B). Though the first electrode pin (31B) inserted into the insulation block (33B) does not contact the inner wall of the tube (11B), the first electrode pin (31B) contacts the second electrode (22B) of the power source (2B), and the second electrode pin (32B) of the light emission device (3B) contacts the inner wall of the tube (11B). Furthermore, the second switch (13B) engages the thread (131B) with the thread (112B) on the other end of the tube (11B) and the second electrode (22B) of the power source (2B) contacts the first electrode pin (31B) of the light emission device (3B) so that by tightening the first switch (12B), the elastic washer (124B) is slightly compressed for the retainer (123B) to contact the first electrode (21B) of the power source (2B) to conduct the power source (2B) and the light emission device (3B) for the light

emission device (3B) to emit light. Further, the light emission device (3B) is prevented from emitting light by loosening the first switch (12B).

The operation of loosening the switch for the third preferred embodiment is similar to that of the second preferred embodiment of the present invention. By referring to the description given for Fig. 5, the description of the operation does not need to be repeated here.

Fig. 7 shows a schematic view of the application of the third preferred embodiment of the present invention in a rifle (5A) where a front sight housing (51A) of the rifle (5A) is too small in size to drill a hole for direct fixation of the tube (11B) of the casing (1B). Therefore, the tube (11B) of the casing (1B) is provided on a barrel or a hand guard of the rifle (5A), leaving both ~~of~~ the first switch (12B) and the second switch (13B) exposed to facilitate operation. Although the light conductor (4) is fixed to the tube (11B), the flexible protection tube (42) and the rigid protection tube (43) are extended to the other end of the optical fiber (41) (not illustrated as it is contained in both of the flexible protection tube (42) and the rigid protection tube (43)) at the location of the front sight (51A).

Figs. 8 and 9 are schematic views showing the third preferred embodiment of the present invention applied to a modern bow (6). Wherein, a comparatively special front sight (61) is provided on the modern bow (6). Therefore, the tube (11B) of the casing (1B) is directly fixed to the front sight (61) of the modern bow (6) while leaving both the first switch (12B) and the second switch (13B) exposed

in order to facilitate operation. Though the light conductor (4) is fixed to the tube (11B), the flexible protection tube (42) and the rigid protection tube (43) are extended to the other end of the optical fiber (41) (not illustrated as it is contained in both of the flexible protection tube (42) and the rigid protection tube (43)) at the location of a front sight housing (62).